



Recent Advances in Science in Western Australia

Earth Sciences

The main aquifers of the upper Murchison River catchment are described in a review by A T Laws of the Geological Survey of WA as calcrete and alluvial deposits in drainage lines with generally <15 m water depth. Other supplies are from weathered bedrock, sedimentary rocks and fractured rocks in the greenstone belts. Water salinity is low beneath drainage divides, and increases towards and down drainage lines.

Laws A T 1992 Hydrogeology of the upper Murchison River catchment. Western Australian Geological Survey Record 1992/6.

M E Barley of the University of Western Australia reviews Archean volcanic-hosted sulfide mineralization in Western Australia. The deposits which range in age from about 3.5 to 2.7 Ga occur mainly in areas of greenschist facies metamorphism in the Warrawoona, Gorge and Whim Creek Groups (eastern and western Pilbara Cratons), and the Norseman-Wiluna and Golden Grove belts (Yilgarn Craton).

Barley M E 1992 A review of Archean volcanic-hosted massive sulfide and sulfate mineralization in Western Australia. Economic Geology 87:855-872.

The Darling Range bauxite deposits, which supply about 17% of the world's alumina, are described in detail by R Anand (CSIRO), R Gilkes (University of Western Australia) and R Cotton (Alcoa). Gibbsite is the dominant form of Al in these deposits, which differ in chemical and mineralogical properties from other Australian deposits.

Anand R R, Gilkes R J, & Roach G I D 1991 Geochemical and mineralogical characteristics of bauxites, Darling Range, Western Australia. Applied Geochemistry 6:233-248.

A major nickel resource, that was originally discovered in 1971, has been delineated within a lensoid sulphide body at Digger rocks, in komatiitic volcanic in the Forrestania greenstone belt of the Yilgarn Craton.

Woodhouse M, Cox R, & Cotton R E 1992 Economic geology of the Digger Rocks nickel deposit, Forrestania, Western Australia. AusIMM Proceedings 297:31-43.

Descriptions by P E O'Brien of the BMR (Canberra) and N Christie-Blick of the Doherty Geological Observatory (New York) of grooved surfaces in the Carboniferous/Permian Grant Group confirm that there were large continental ice sheets during the Late Palaeozoic glaciation. Pebbles of banded iron-formation in marine diamictites associated with the grooved surfaces indicate motion of ice from 400 km to the south in the Pilbara Craton.

O'Brien P E & Christie-Blick N 1992 Glacially grooved surfaces in the Grant group, Grant Range, Canning Basin and the extent of Late Palaeozoic Pilbara ice sheets. BMR Journal of Australian Geology and Geophysics 13:87-92.

A regional study of deep formation waters by researchers from the BMR (Canberra) and ANU contributes to an assessment of groundwater resources and genesis of Mississippi Valley style Pb-Zn deposits. There is a wide salinity range from almost fresh water to brine water, most of which is in the Willara and Kidson Sub-basins that were sites of sabkhas and extensive evaporite deposits.

Ferguson J, Etiman H, & Ghassemi F 1992 Salinity of deep formation water in the Canning Basin, Western Australia. BMR Journal of Australian Geology and Geophysics 13:93-105.

Life Sciences

CSIRO entomologists J K Scott and E S Delfosse census 251 South African plants introduced to Australia, of which 68 are weeds of importance to agriculture, forestry and conservation. This review ranks the weeds in importance of biological control, prioritizes future research, and provides an extensive bibliography.

Scott J K & Delfosse E S 1992 Southern African plants naturalized in Australia: a review of weed status and biological control potential. Plant Protection Quarterly 7:70-79.

K Christian of the Northern Territory University and S Morton of CSIRO (Alice Springs) describe an exceedingly thermophilic central Australian ant which tolerates body temperatures up to 56.7°C. The ants are active during the hottest periods of summer, preferring to be active at surface temperatures about 60°C and avoiding temperatures less than 56°C.

Christian K A & Morton S A 1992 Extreme thermophilia in a central Australian ant, *Melophorus bagoti*. Physiological Zoology 65:885-905.

A study of the goanna *Varanus gouldii* at the Karrakatta Cemetery, Perth, by G Thompson of the University of Western Australia and Edith Cowan University, indicates that daily movements of lizards were erratic and variable. The average travel distance was about 110 m per day, and the daily foraging area was about 300 m².

Thompson G 1992 Daily distance travelled and foraging areas of *Varanus gouldii* (Reptilia: Varanidae) in an urban environment. Wildlife Research 19:743-753.

The golden bandicoot, studied on Barrow Island by P Withers of the University of Western Australia, is a small, arid-adapted marsupial with a low and labile body temperature. In metabolic, hygric and thermal physiology, the golden bandicoot resembles the bilby and differs from temperate and tropical bandicoots.

Withers P C 1992 Metabolism, water balance and temperature regulation in the golden bandicoot (*Isodon auratus*). Australian Journal of Zoology 40:523-531.

In the latest edition of his book, H Cogger provides taxonomic keys and a detailed description and a colour plate for species of Australian amphibians and reptiles.

Cogger, H G 1992 Reptiles and Amphibians of Australia. Reed, Frenchs Forest, NSW.

The specific identity of the common goanna, *Varanus gouldii*, is brought into question by W Böhme of the Zoological Institute and Museum of Koenig (Bonn). He suggests that the species name *gouldii* should be applied to what is currently recognised as *Varanus panoptes*, and the currently recognised *V. gouldii* should be named *V. flavivirufus*.

Böhme W 1991 The identity of *Varanus gouldii* (Gray, 1838), and the nomenclature of the *V. gouldii*-species complex. Mertensiella 2:38-41.

S Garnett of the Royal Australasian Ornithologists Union considers the conservation status of all species or subspecies of Australia's threatened or extinct birds (14% of the total of 1074 bird taxa). He provides a summary of the status, distribution, habitat, remarks and references for each of the bird species or subspecies.

Garnett S 1992 Threatened and extinct birds of Australia. RAOU Report Number 82. RAOU, Moonee Ponds, Victoria.

D Pearson of the Department of Conservation and Land Management in his review of the past and present distribution of the black-footed rock-wallaby in the Warburton region of Western Australia, notes that the species was in a major decline by the mid 1970's and that continuing local extinctions require intervention for their long-term conservation.

Pearson D J 1992 Past and present distribution and abundance of the black-footed rock-wallaby in the Warburton region of Western Australia. *Wildlife Research* 19:605-622.

Macro-invertebrates, zooplankton and water quality parameters were used by researchers at Murdoch University and the Water Authority of Western Australia to classify and ordinate wetlands, and correlate the findings with environmental variables. The most nutrient enriched wetlands were dominated by cosmopolitan species with high abundances, whereas other wetlands had species with more restricted ranges and lower abundances.

Growns J E, Davis J A, Cheal F, Schmidt L G, Roswich R S & Bradley S J 1992 Multivariate pattern analysis of wetland invertebrate communities and environmental variables in Western Australia. *Australian Journal of Ecology* 17:275-288.

The phylogenetic relationships of Australian chelid turtles, investigated by A Georges (University of Canberra) and M Adams (South Australian Museum) using allozyme electrophoresis, revealed five distinct clades recognised at the generic level, *Elseya*, *Emydura*, *Rheodytes*, the *Elseya latisternum* group, and an undescribed species.

Georges A & Adams M 1992 A phylogeny for Australian chelid turtles based on allozyme electrophoresis. *Australian Journal of Zoology* 40:453-476.

The electronic data base of the Queensland Museum's register has been used by G Ingram and R Raven to map distributions of frogs, reptiles, birds and mammals of Queensland, prepare checklists of those species, and summarise the rare, endangered, vulnerable and poorly known species.

Ingram G J & Raven R J 1991 An atlas of Queensland's frogs, reptiles, birds and mammals. Queensland Museum, Brisbane.

Note from the Hon Editor: This column helps to link the various disciplines and inform others of the broad spectrum of achievements of WA scientists (or others writing about WA). Contributions to "Recent Advances in Science in Western Australia" are welcome, and may include papers that have caught your attention or that you believe may interest other scientists in Western Australia and abroad. They are usually papers in referred journals, or books, chapters and reviews. Abstracts from conference proceedings will not be accepted. Please submit short (2-3 sentence) summaries of recent papers, together with a copy of the title, abstract and authors' names and addresses, to the Hon Editor or a member of the Publications Committee: Dr S D Hopper (Life Sciences), and Dr A E Cockbain (Earth Sciences). Final choice of articles is at the discretion of the Hon Editor.

"Letters to the Editor" concerning scientific issues of relevance to this journal are also published at the discretion of the Hon Editor. Please submit a word processing disk with letters and suggest potential reviewers or respondents to your letter. P C Withers, Hon Editor, *Journal of the Royal Society of WA*.